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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/658,184	09/08/2000	Xiang-Gen Xia	131*198	3318
23416	7590	11/09/2004	EXAMINER	
CONNOLLY BOVE LODGE & HUTZ, LLP P O BOX 2207 WILMINGTON, DE 19899			WILSON, ROBERT W	
			ART UNIT	PAPER NUMBER
			2661	

DATE MAILED: 11/09/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/658,184

Applicant(s)

XIA, XIANG-GEN

Examiner

Robert W Wilson

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 22 October 2004.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 9-18 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 9-18 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

### DETAILED ACTION

**1.0** The application of Xiang-Gen Xia entitled "PRECODED OFDM SYSTEMS ROBUST TO SPECTRAL NULL CHANNELS AND VECTOR OFDM SYSTEM WITH REDUCED CYCLIC PREFIX LENGTH" which was filed on 9/8/2000 and amended on 10/22/04 with benefit based upon 60/153,489 dated 9/11/99 was examined. Claims 9-18 are pending.

#### *Claim Rejections - 35 USC § 103*

**2.0** The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

**3.0** **Claims 9-10** are rejected under 35 U.S.C. 103(a) as being unpatentable over Jones et. al. (U.S. Patent No.: 6,657,950) in view of Belotserkovsky et. al. (U.S. patent No.: 6,628,735)

Referring to **Claim 9**, Jones et. al. (U.S. Patent No: 6,657,950) teaches: A method of precoding an orthogonal frequency division multiplexing (OFDM) system  
Inserting one of more zeros between at least two sets of consecutive information symbols of the OFDM system (OFDM symbols are upsampled by adding L-1 zeros between baseband symbols or precoding which reduces ISI per col. 1 line 5 –col. 2 line 39 or 102 per Fig 1 adds 3 zeros per symbol and upsamples to 4 times creating the spectrum per Fig 2B in which the rate is increased and ISI is lowered or per col. 3 line 41-col. 6 line 48)

Expanding a data rate of the OFDM system due to the insertion of zeros (OFDM symbols are upsampled by adding L-1 zeros between baseband symbols or precoding which reduces ISI per col. 1 line 5 –col. 2 line 39 or 102 per Fig 1 adds 3 zeros per symbol and upsamples to 4 times creating the spectrum per Fig 2B in which the rate is increased and ISI is lowered or per col. 3 line 41-col. 6 line 48)

And removing spectral nulls of an intersymbol interference (ISI) channel of the OFDM system due to expansion of the data rate of the OFDM system (OFDM symbols are upsampled by adding L-1 zeros between baseband symbols or precoding which reduces ISI per col. 1 line 5 –col. 2 line 39 or 102 per Fig 1 adds 3 zeros per symbol and upsamples to 4 times creating the

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spectrum per Fig 2B in which the rate is increased and ISI is lowered or per col. 3 line 41-col. 6 line 48)

Jones does not expressly call for: removing the spectral nulls but teaches intersymbol interference is decreased by adding L-1 zeros per col. 1 line 5-col. 2 line 39.

Belotserkovsky et. al. (U.S. patent No.: 6,628,735) teaches: removing the spectral nulls occurs by adding a cyclic prefix or zeros thereby preventing inter-symbol interference per col. 3 line 1-col. 4 line 67.

It would have been obvious to one of ordinary skill in the art at the time of the invention that adding the cyclic prefix or zeros which results in removing the spectral nulls of Belotserkovsky would result in spectral nulls being removed when L-1 zeros and upsampling as performed by Jones .

**In Addition Jones teaches:**

Regarding **Claim 10**, wherein the OFDM system is precoded independent of the ISI channel (The applicant broadly claims “precoded independently”. The examiner interprets adding zeros as “precoding” and this is performed independently of the ISI channel per (col.1 line 5-col. 6 line 47)

***Claim Rejections - 35 USC § 102***

**4.0** The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting directly or indirectly from an international application filed before November 29, 2000. Therefore, the prior art date of the

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reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

**5.0 Claim 17** is rejected under 35 U.S.C. 102(e) as being anticipated by Van Nee (U.S. Patent No.: 6,175,550).

Referring to **Claim 17**, Van Nee teaches: A method of reducing a data rate overhead of an OFDM system, wherein the method reduces the data rate overhead of the OFDM system K times (The applicant broadly claims “reducing a data rate overhead rate” and “k times”. The reference teaches that by changing the coding rate that the data rate which the examiner interprets as the data overhead rate is lowered by a factor which the examiner interprets as k per col. 1 line 37- col. 4 line 67 or per Fig 1)

### ***Claim Rejections - 35 USC § 112***

**6.0** The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

**7.0 Claims 11-16** are rejected relative to 112/2<sup>nd</sup> paragraph because the metes and bounds of the claims cannot be assessed.

Referring to **Claim 11**, it is not clear from the claim how the vector sizes M & K relate to the input sequence nor is it clear where the precoding is performed. What is meant by “M” & “K”? Where is the precoding performed?

Referring to **Claim 12**, What is meant by “M-K”? If M is less than or equal to K then one inserts a negative number or zero zeros? What is meant by inserting negative number of zeros or zero zeroes?

Referring to **Claim 13**, What is meant by “G(Z) is independent of the ISI channel”? Does that mean that G(Z) represents a transfer function that has been defined independently of the transfer function associated with the ISI channel?

Referring to **Claim 14**, What is meant by “maintain” energy of the signal of the OFDM system? Does the applicant mean that when utilizing the precoding technique that is not necessary to increase the signal energy in order to achieve the same data rate?

Referring to **Claim 16**, What is meant by “the method comprising: providing a precoder ...of the OFDM system”? The steps of the claim are very confusing. For example it is not clear what is

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meant by “maintaining the data rate” while “reducing the overhead data rate”. The examiner suggest that the applicant rewrite the claim defining the steps in such a way that is clear how the overhead data rate is reduced while the same data rate is achieve without reducing the overhead data rate.

***Claim Rejections - 35 USC § 112***

**8.0** The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

**9.0** **Claims 17-18** are rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential steps, such omission amounting to a gap between the steps. See MPEP § 2172.01. The omitted steps are: are the method of achieving the result claimed.

Referring to **Claim 17**, The claim states the result of the method without state the active steps which were required to achieve the method.

Referring to **Claim 18**, The claim states the result of the method without state the active steps which were required to achieve the method. This claim also dfines a further limiting step which is not a claim limitation.

***Claim Rejections - 35 USC § 112***

**10.0** The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

**11.0** **Claim 18** is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

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Referring to **Claim 18**, The specification on Pgs 10-12 describe a identify matrix which when utilized to perform precoding results in a removing of spectral nulls. The specification on Pages 18-19 states that my utilizing the identify matrixed squared in the precoder results in being reduced by a factor of  $K$  where  $K$  is the vector size. Where in the specification does the it state that the squared identity matrix results in removing spectral nulls.

### ***Response to Arguments***

**12.0** Applicant's arguments with respect to claims 9-18 have been considered but are moot in view of the new ground(s) of rejection.

Please refer to the above rejection for details.

**13.0** Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a).

Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

### ***Conclusion***

**15.0** The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

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Xia et. al., U.S. Patent No.: 6,493,399 dated 12/10/02 is a 102 (e) reference which has the same assignee on the data of invention, consequently, using this reference is inappropriate.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Robert W Wilson whose telephone number is 571/272-3075. The examiner can normally be reached on M-F (8:00-4:30).

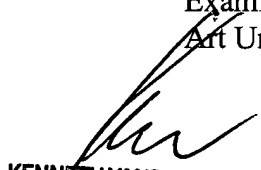
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kenneth Vanderpuye can be reached on 571/272-3078. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Robert W Wilson  
Examiner  
Art Unit 2661

RWW  
November 4, 2004



KENNETH VANDERPUYE  
PRIMARY EXAMINER